ธนาคารแห่งประเทศไทย
BANK OF THAILAND

Firm Inflation Expectations and the Macroeconomy: Evidence from Thailand

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Bank of Thailand
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Evidence from literature

Bias & disagreement in firms' inflation expectations for AEs

- Reflects unanchored firm inflation expectations from inattention to aggregate inflation dynamics and monetary policy (Kumar et al. 2015; Savignac et al, 2021; Candia et al., 2024)
- Inflation expectations shape investment and employment decisions (Coibion et al. 2018; Coibion et al. 2020)

Limited understanding in EMs

- Anchoring inflation expectations may be more challenging for EMs (Kose et al., 2019)
- Greater exposure to global shocks may matter for the size, duration and dispersion of shock pass-through to inflation expectations (Aguilar et al. 2024; Mello and Ponce, 2025)

This paper…

Aims to study for the case of an EM ie. Thailand :

[1] Drivers of Firm Inflation Expectations

- Role of macroeconomic drivers (e.g. recent inflation economic slack, oil prices) & firm-level conditions

[2] Dynamic Shock Pass-Through to Inflation Expectations

- Dynamic impact of shocks (oil supply news shocks, minimum wage hike) and implications for anchoring

[3] Role of Inflation Expectations on Firm Decisions

- How inflation expectations influence firms' price-setting, investment and employment decisions

[4] Heterogeneity of findings across

- Firm characteristics (size, sector, export exposure)
- Economic states (lower vs. higher inflation episode, cyclical upturn vs. downturn)

Data

Business Sentiment Index (BSI) Survey coverage

- **Period:** 2008M1-2023M12
- **Total :** 88,450 firm-month observations
- ~570 firms per month (mostly Bangkok)
- 495 firms with ≥ 100 observations (~10 years)
- Exclude firms with too few responses & repetitive inflation answers

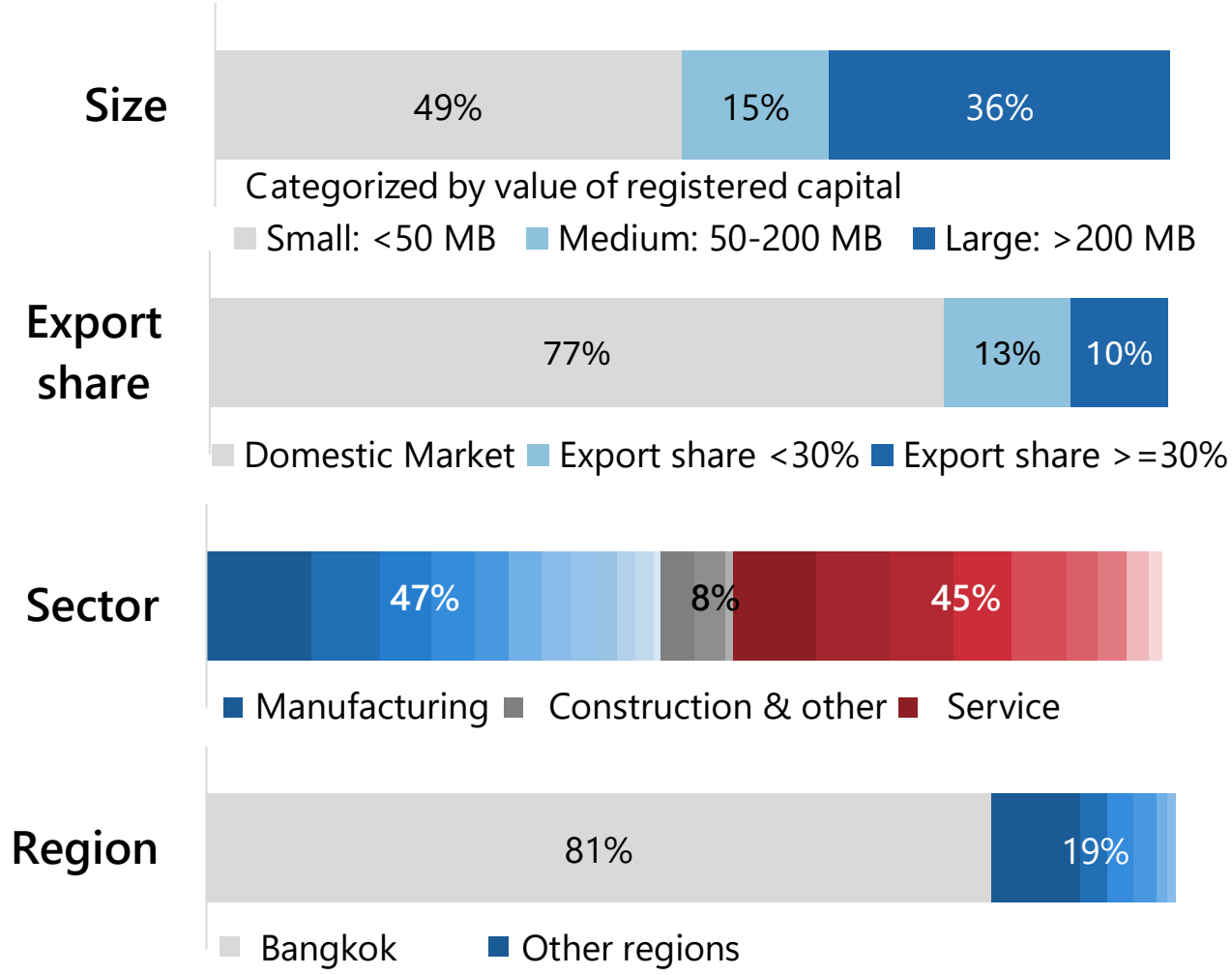
Measurement of Inflation Expectations

- Firms report expected inflation over the next 12 months
- Two types of responses: Exact figure, Pre-defined bins (from 2012, bin size changed from 2 to 1%)
- Bins span <0% to ≥7%,
- Analysis using the median value of selected bins

Survey questions

- Firm sentiment and decisions with respect to (current and future) sales, production, product prices, employment, investment, input costs
- Factors contributing to inflation expectation formation (e.g., energy price, financial cost, labor cost, demand)

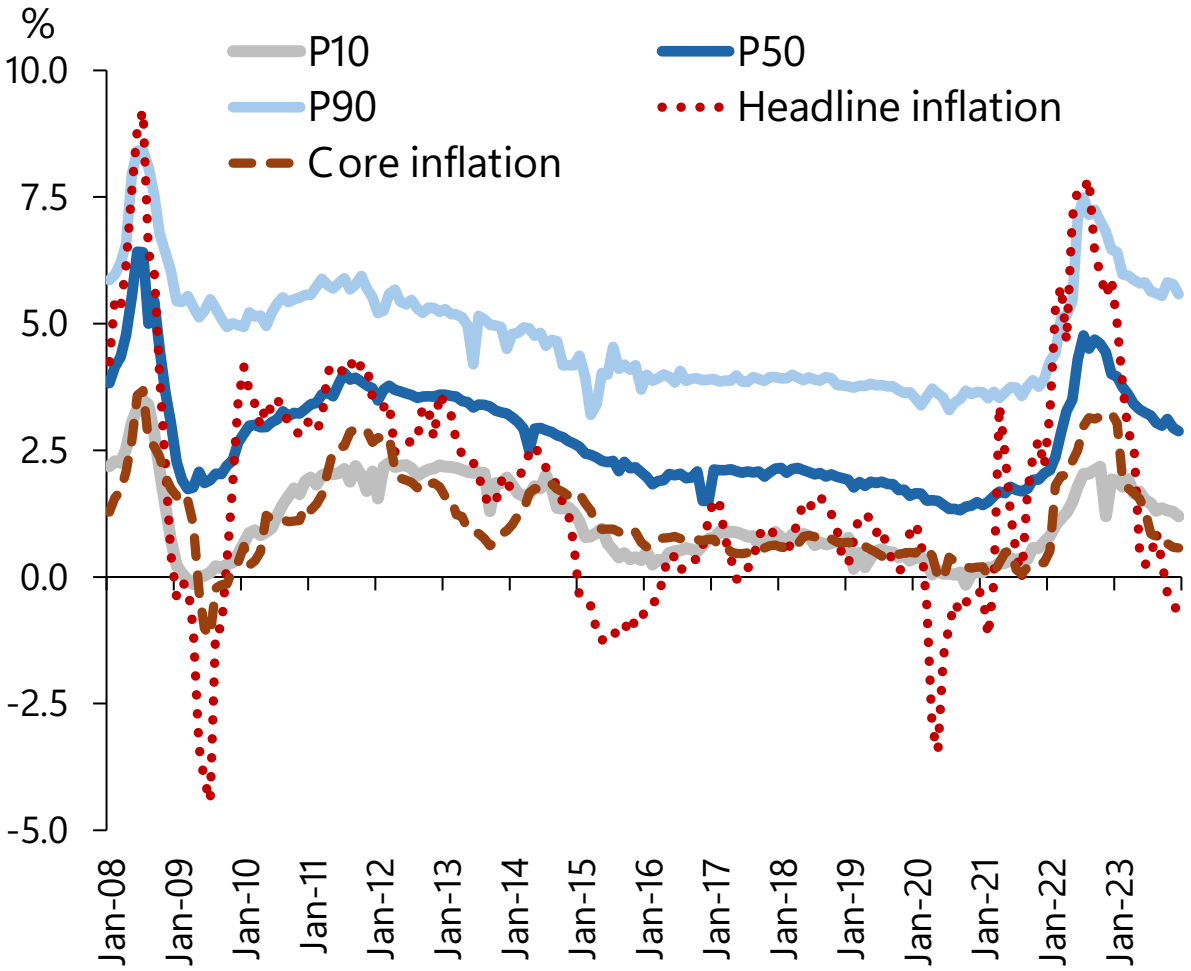
Percentage of Firms



Source : Bank of Thailand

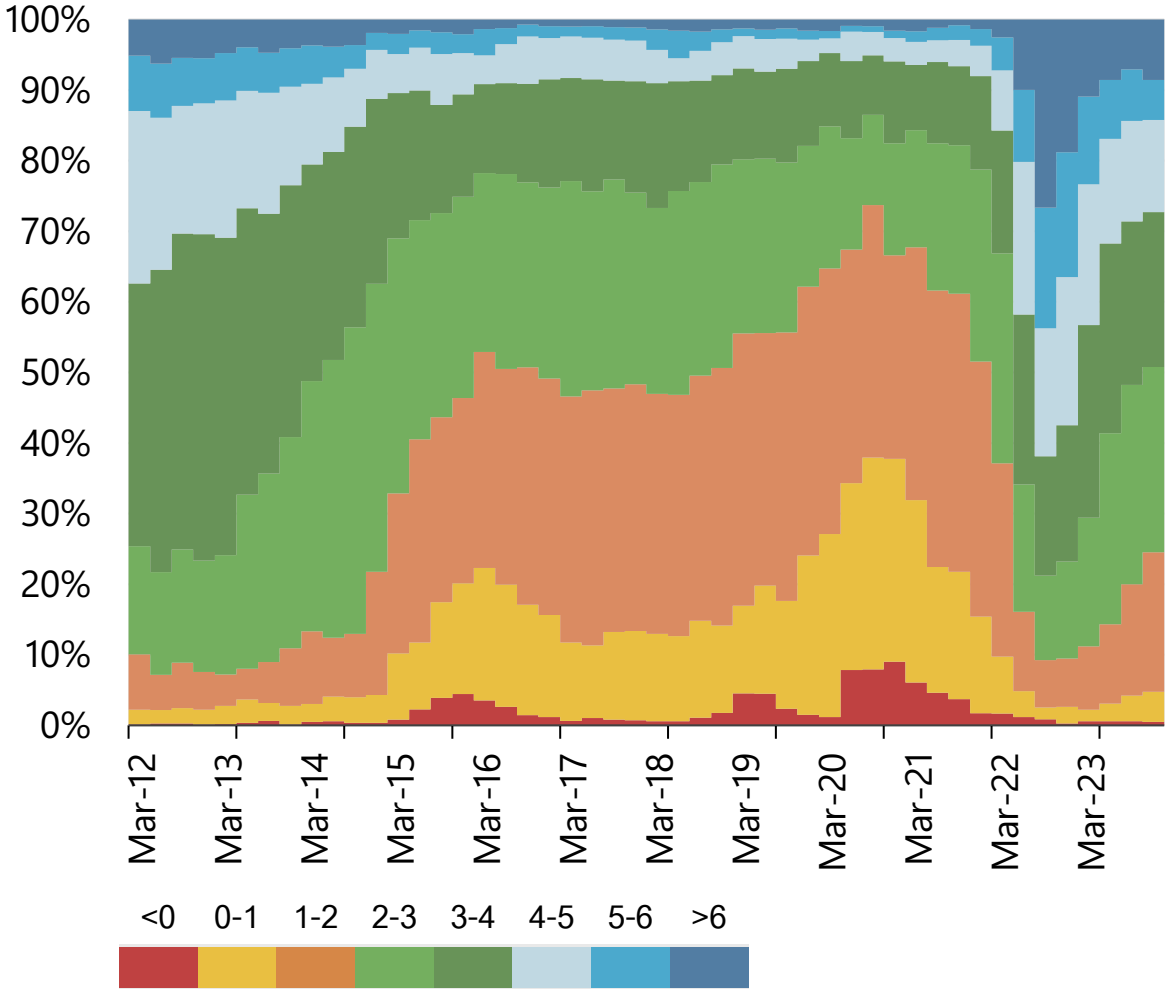
Stylized facts

Firm Inflation Expectations and Realized inflation



Source: The Ministry of Commerce, the Bank of Thailand

Distribution of inflation expectations across firms



Source : Bank of Thailand

Drivers of Firm Inflation Expectations

Inflation & components

Macro-economic drivers

Firm-specific conditions

	Dependent variable: Midpoint of expected inflation range						
Variables	1	2	3	4	5	6	7
Headline inflation	0.595*** (0.026)			0.029 (0.023)	-0.077* (0.024)	-0.077* (0.024)	-0.082* (0.022)
Energy inflation		0.172*** (0.017)	0.207*** (0.018)				
Raw food inflation		0.119*** (0.004)	0.120*** (0.004)				
Core inflation		0.495*** (0.016)					
Core (food) inflation			0.153*** (0.006)				
Core (non-food) inflation			0.256*** (0.010)				
Dubai oil price				0.324*** (0.008)	0.294*** (0.007)	0.294*** (0.007)	0.266*** (0.014)
Global inflation				0.419*** (0.023)	0.467*** (0.027)	0.467*** (0.027)	0.484*** (0.036)
GDP growth					0.080** (0.017)	0.080** (0.017)	0.066* (0.020)
Change in USD/THB exchange rate					0.100*** (0.005)	0.100*** (0.005)	0.082** (0.008)
Minimum wage growth					0.112*** (0.007)	0.096** (0.010)	0.106*** (0.009)
Minimum wage growth × Labor intensity						0.127 (0.132)	0.043 (0.154)
Economic situation / turnover: Increase							-0.029 (0.118)
Economic situation / turnover (next 3m): Increase							0.018 (0.018)
Cost: Increase							0.039 (0.026)
Cost (next 3m): Increase							0.175** (0.039)
Observations	62878	62878	62878	62878	62766	62766	49409
Adj. R-squared	0.480	0.510	0.513	0.521	0.530	0.530	0.543
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

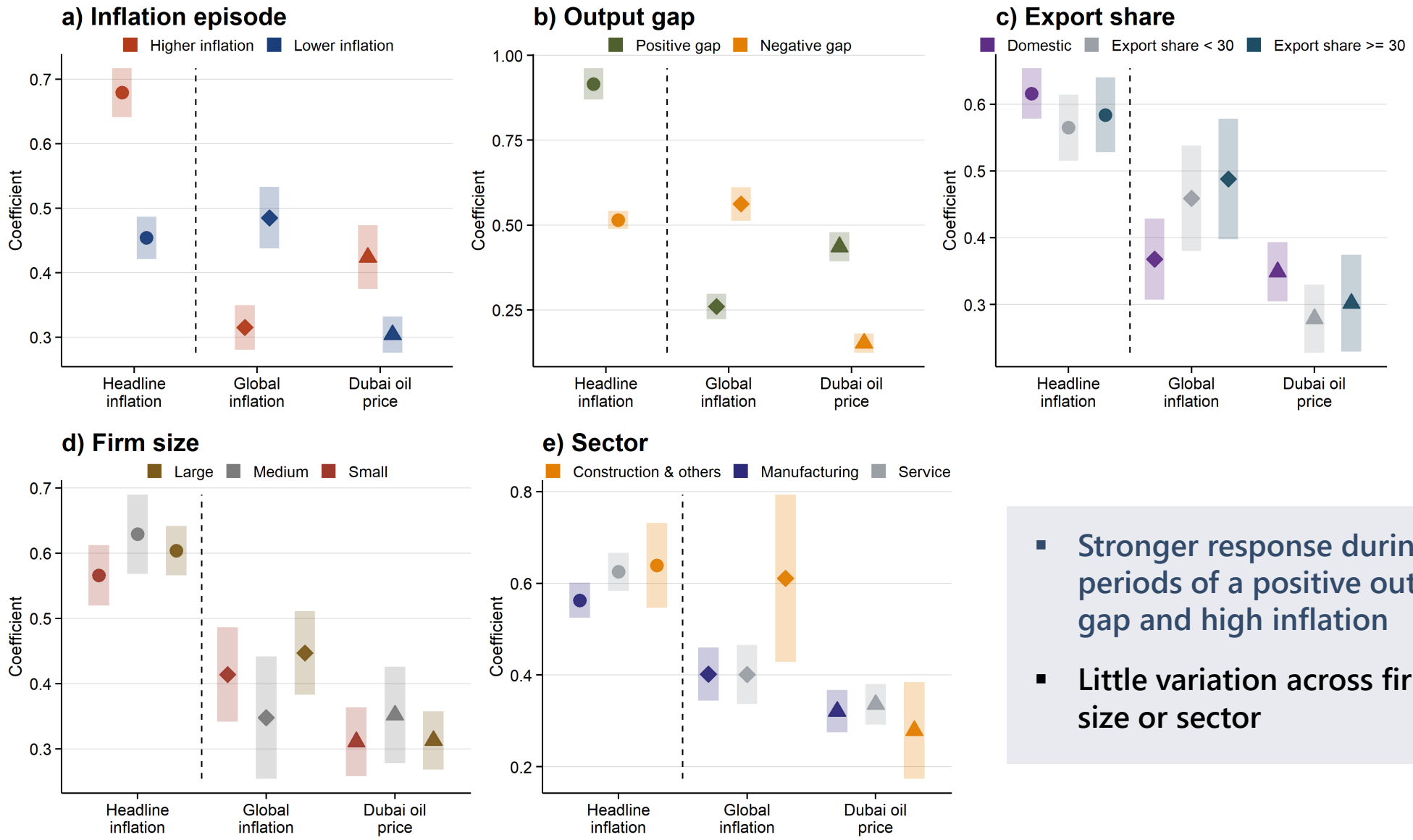
Note: Displayed are results from the panel regression of firms' one-year-ahead expected inflation. Clustered standard errors are shown in parentheses. The sample period is from 2012–2023. Significance *** p<0.01, ** p<0.05, * p<0.1.

Headline inflation: unsurprisingly important; core (non-food) reflects underlying inflation dynamics

Macroeconomic factors dominant drivers, especially global inflation and oil prices

Firm-level conditions : secondary role, significant only input cost expectations

Heterogeneity in the Expected Inflation Response across Economic States and Firms



- Stronger response during periods of a positive output gap and high inflation
- Little variation across firm size or sector

Dynamic Shock Pass-Through to Inflation Expectations

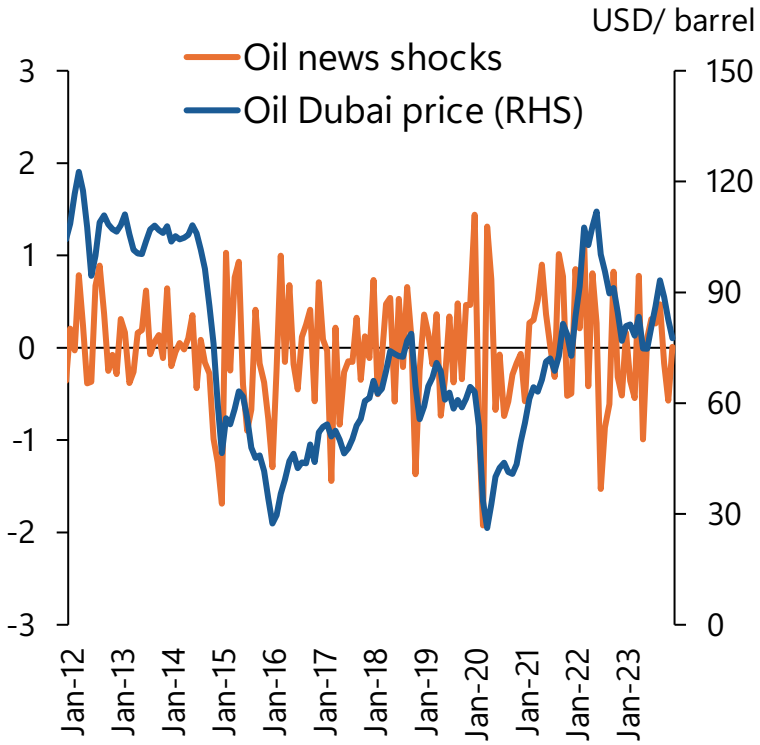
(oil supply news shocks and minimum wage hike)

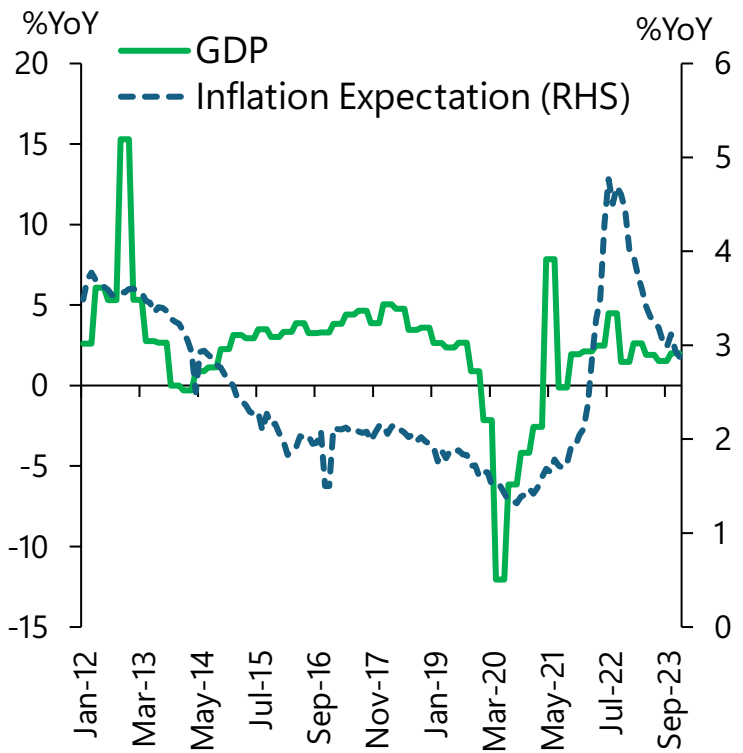
Global Oil Supply News Shocks

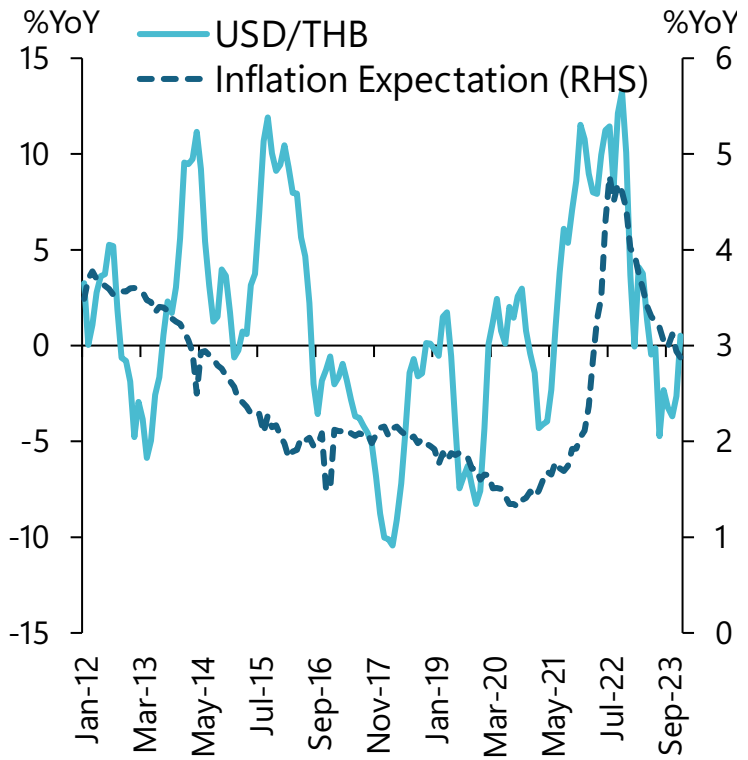
- Use **local projection model** to trac the dynamics of oil supply news shocks on firm inflation expectation.

$$\pi^e_{i,t+h} = \delta_h \pi^e_{i,t-1} + \gamma_h \varepsilon^{oil}_t + \beta_h X_{t-1} + W_i + \epsilon_{i,t+h}$$

- ε^{oil}_t represents **Oil Supply News Shocks** as constructed by Kanzig (2021)
- Include Macro controls (X_{t-1}), firm fixed effects (W_i)



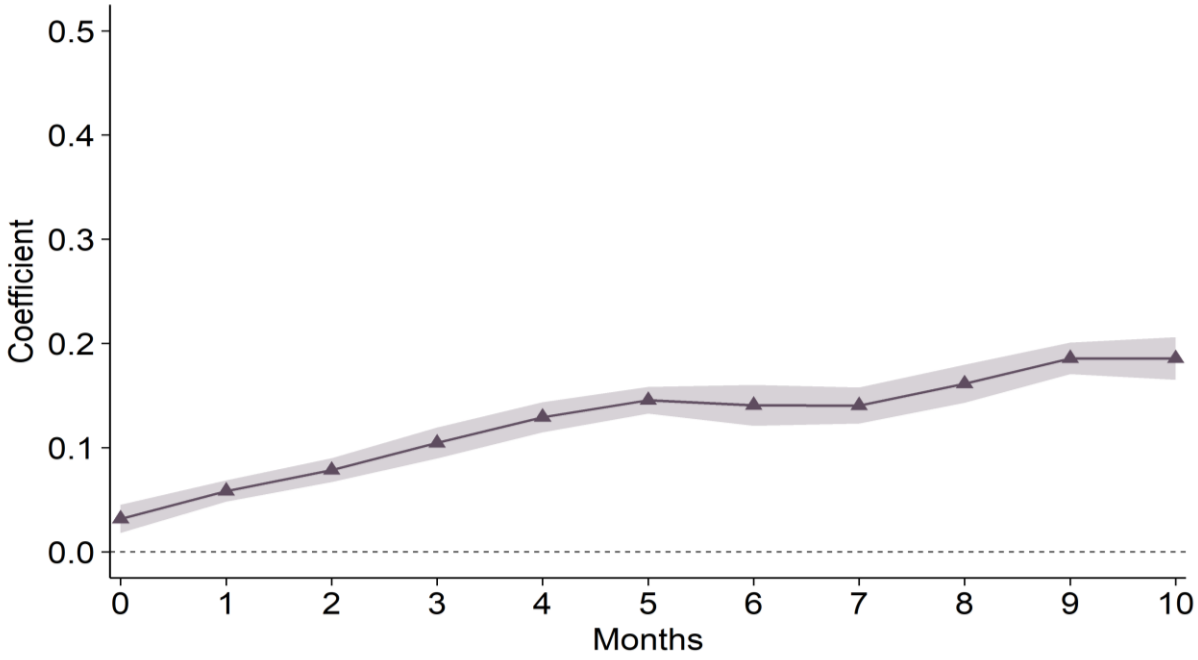




Global Oil Supply News Shocks

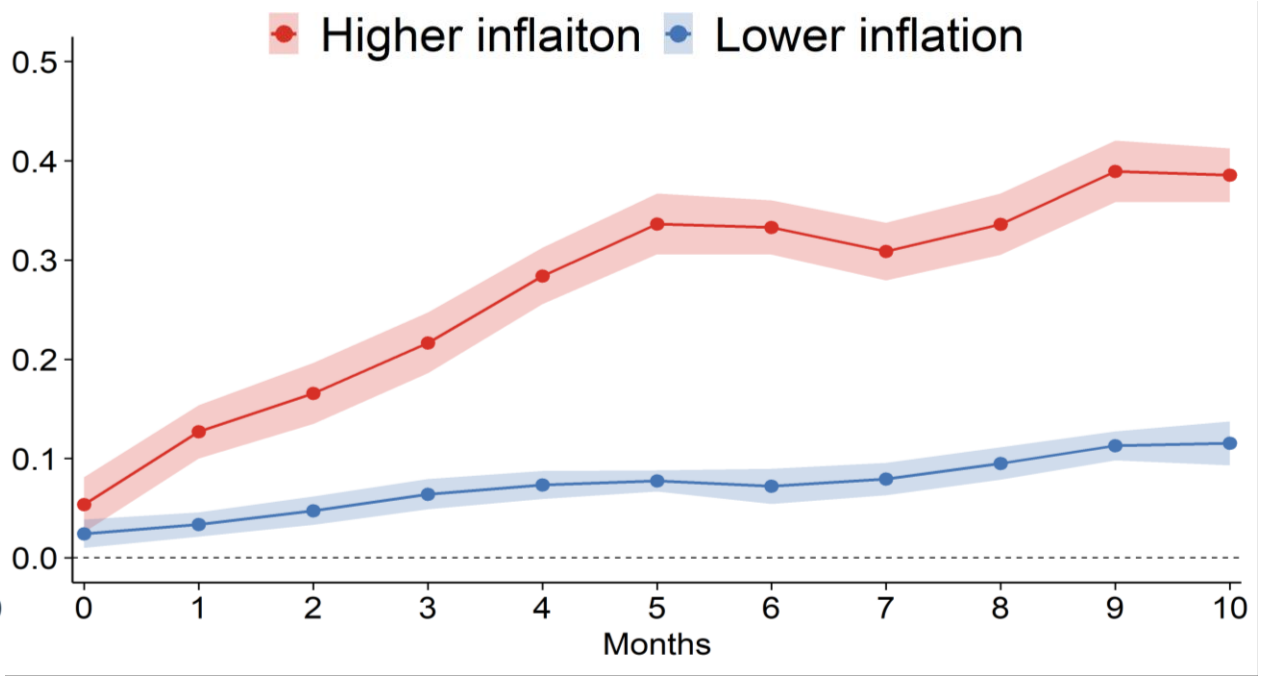
a) Full sample

Persistent response to oil supply shocks



b) Inflation episodes

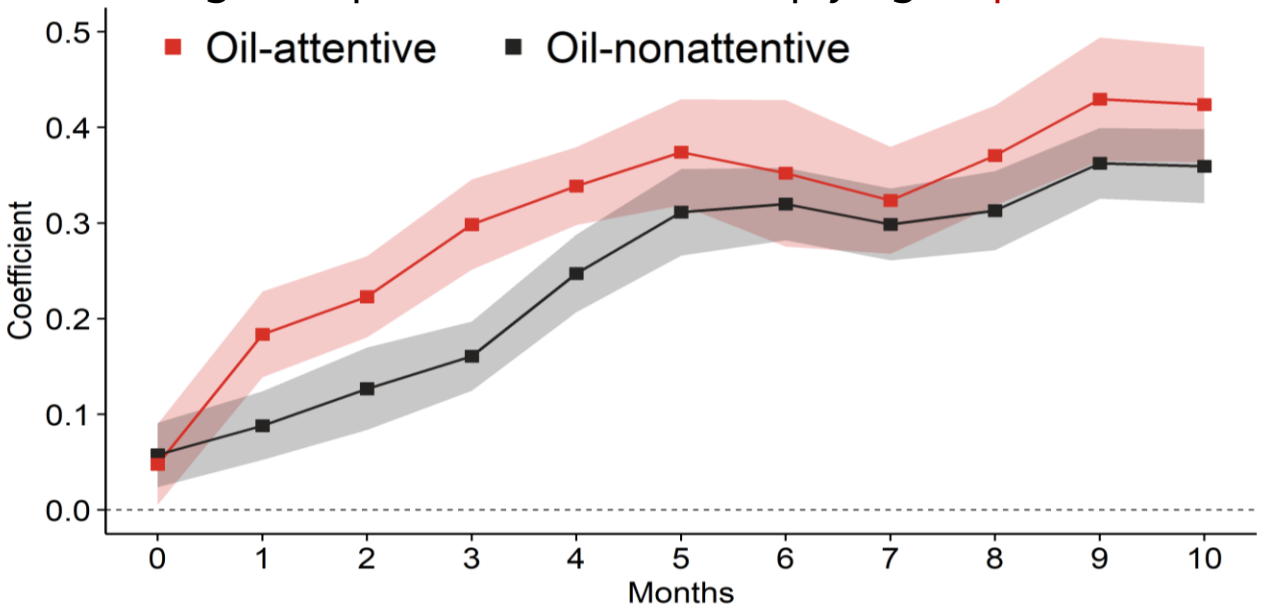
More attentive to shocks in higher inflation environment.



Global Oil Supply News Shocks

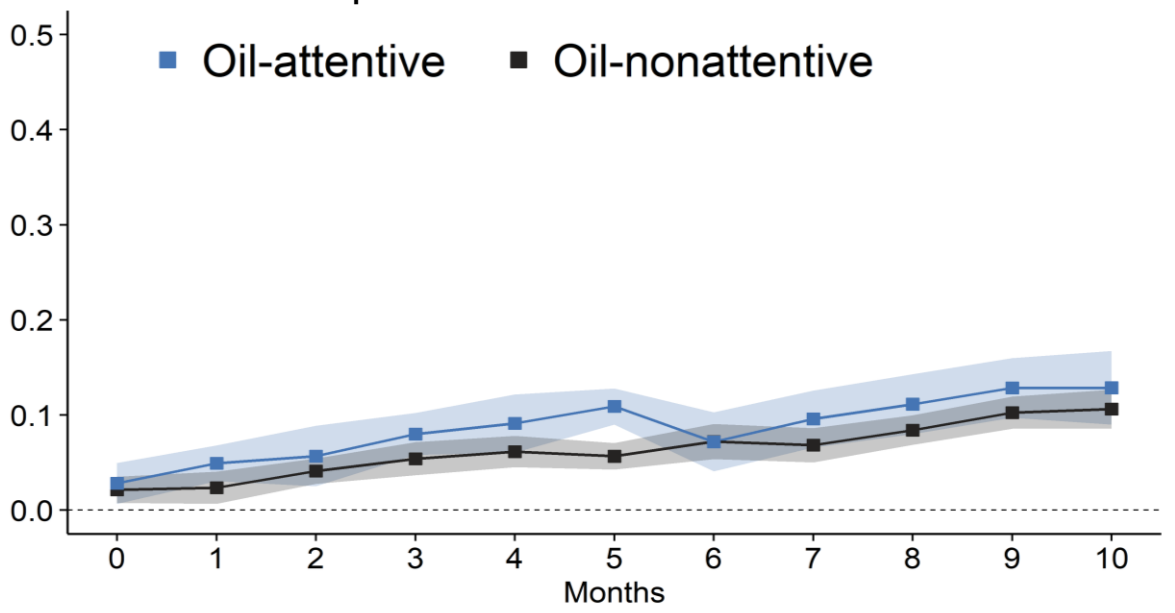
c) Higher inflation

Slight response differences implying oil price salience



d) Lower inflation

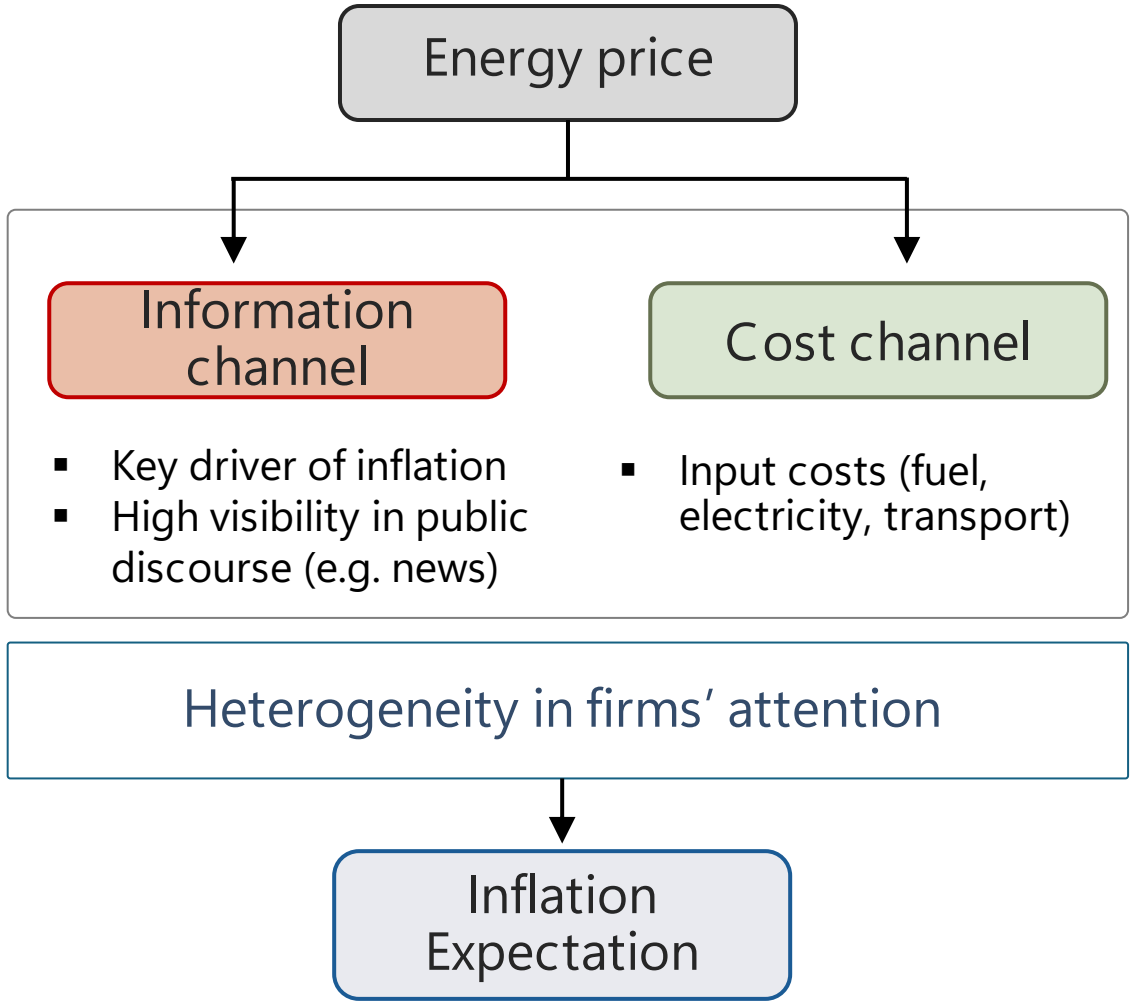
Similar responses

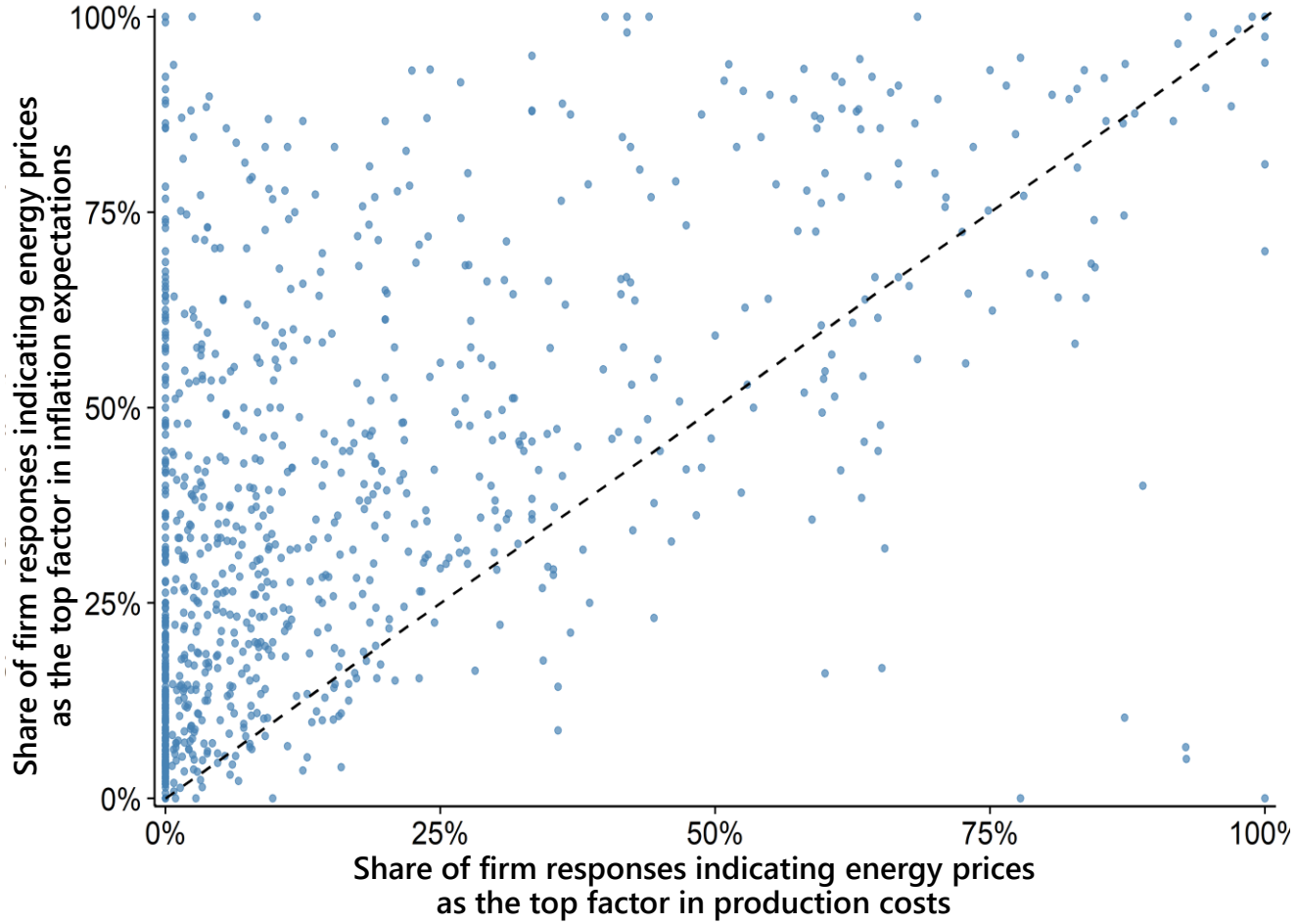


Firm classification

- Firms select **top 3 factors** affecting their inflation expectations.
- A firm is classified as **oil-sensitive** if energy prices are ranked first in at least 40% of responses.

The Role of energy price for Firm Inflation Expectation vs cost of production

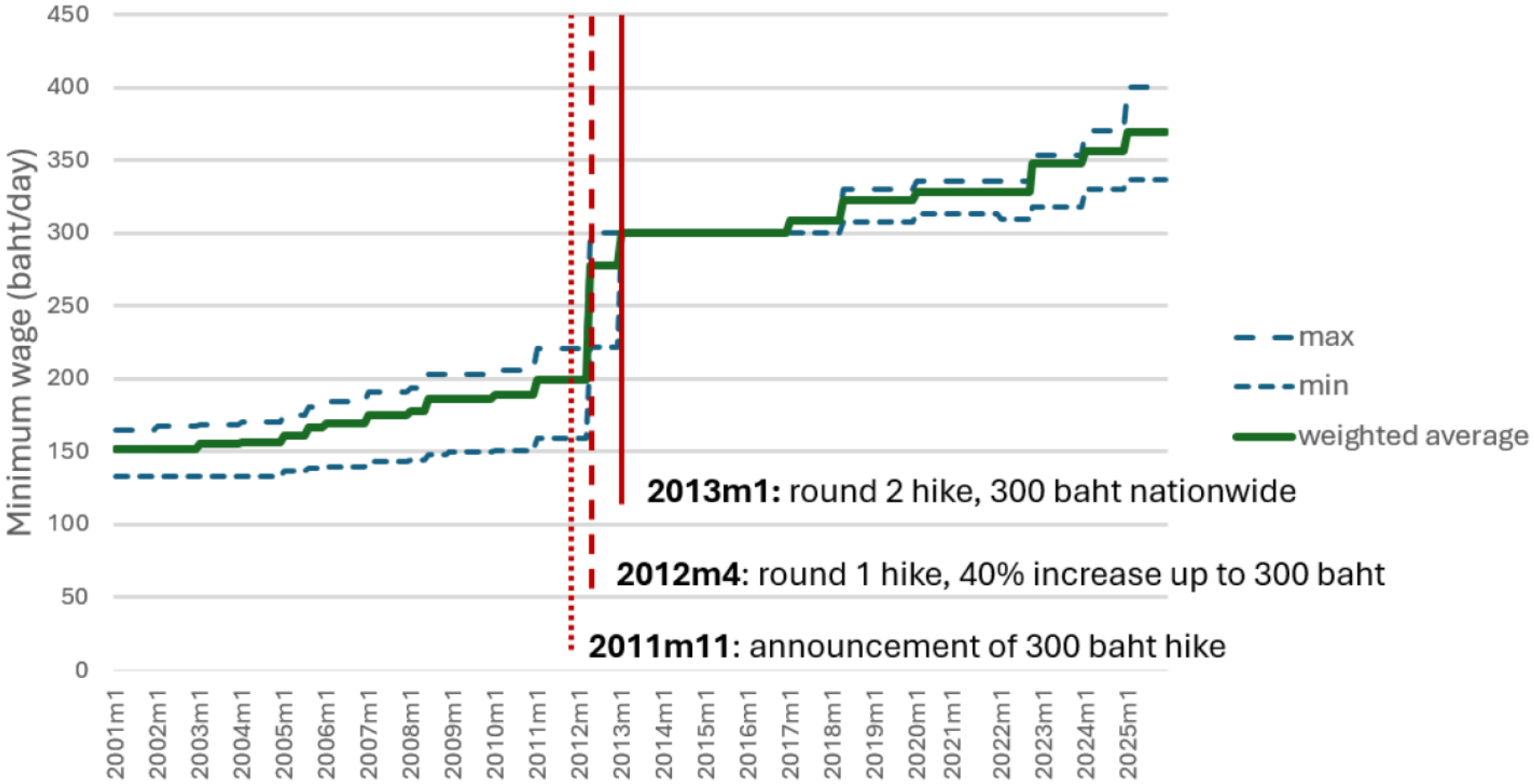




Note: Each data point in the plot above represents the share of a given firm's monthly responses over the full sample (in percent) that indicate energy prices to be the most important factor in forming inflation expectations (y-axis) and as a key cost factor for production (x-axis).

Minimum wage shocks

- Unexpected and large minimum wage hike in Thailand in 2012



Difference-in-Differences

$$\pi^{e}_{i,t} = \sum_j \beta^{A}_j FA_{s,p} \times WageIntensity_j \times 1\{t \in T_A\} + ...$$
$$\sum_j \beta^{R1}_j FA_{s,p} \times WageIntensity_j \times 1\{t \in T_{R1}\} + ...$$
$$\sum_j \beta^{R2}_j FA_{s,p} \times WageIntensity_j \times 1\{t \in T_{R2}\} + ...$$
$$+ \sum_j \delta_j FA_{s,p} \times WageIntensity_j + \alpha^{A} T_A + \alpha^{R1} T_{R1} + \alpha^{R2} T_{R2} + \beta X_{t-1} + \gamma W_i (+\lambda_t) + \epsilon_{i,t},$$

- T0: 2011m5–2011m10 before announcement

Treatment periods

- TA: 2011m11–2012m3 the announcement phase
- TR1: 2012m4–2012m12 post–round 1 hike
- TR2: 2013m1–2013m12 post–round 2 hike

Variation used for identification

Fraction of workers affected by wage hike

- Exposure defined at the ISIC 5-digit × province level
- Measured using pre-treatment worker shares from Social Security records
- Sizable variations (mean = 0.38, SD = 0.22)

X

Firm classification

- Firms select **top 3 factors** affecting their expected cost of production.
- A firm is classified as **Wage-intensive** if labor costs are ranked top 3 drivers in at least 50% of responses.

Regression results

Table 3: Difference-in-Differences Results: Minimum Wage Hike and Inflation Expectations

	Dependent variable: expected inflation (midpoint of the range)				
Variables	1	2	3	4	5
MW worker share	-0.368***	-0.445			
× wage-intensive firm	(0.132)	(0.416)			
MW worker share	-0.282**	-0.338			
× non-wage-intensive firm	(0.142)	(0.373)			
TA	0.559***	0.519***	0.552***		
	(0.111)	(0.067)	(0.078)		
TR1	0.781***	0.724***	0.803***		
	(0.135)	(0.206)	(0.216)		
TR2	0.483***	0.436**	0.518***		
	(0.126)	(0.173)	(0.192)		
MW worker share × TA	0.345*	0.434***	0.335*	0.032	0.343**
× wage-intensive firm	(0.201)	(0.153)	(0.168)	(0.317)	(0.164)
MW worker share × TR1	0.142	0.276	0.047	-0.139	0.055
× wage-intensive firm	(0.174)	(0.440)	(0.460)	(0.459)	(0.457)
MW worker share × TR2	0.044	0.148	-0.139	-0.261	-0.126
× wage-intensive firm	(0.165)	(0.367)	(0.374)	(0.410)	(0.375)
MW worker share × TA	-0.053	0.164	-0.011	-0.084	0.046
× non-wage-intensive firm	(0.223)	(0.192)	(0.174)	(0.312)	(0.171)
MW worker share × TR1	-0.394**	-0.140	-0.409	-0.446	-0.388
× non-wage-intensive firm	(0.192)	(0.448)	(0.479)	(0.503)	(0.481)
MW worker share × TR2	-0.407**	-0.164	-0.461	-0.464	-0.433
× non-wage-intensive firm	(0.183)	(0.388)	(0.456)	(0.437)	(0.464)
Observations	15,126	14,806	14,806	14,806	14,806
Adj. R-squared	0.062	0.073	0.467	0.082	0.477
Month fixed effects	No	No	No	Yes	Yes
Firm characteristics	No	Yes	No	Yes	No
Firm fixed effects	No	No	Yes	No	Yes

Note: Displayed are results from the difference-in-differences estimation, with firms' one-year-ahead expected inflation as the dependent variable. Clustered standard errors are shown in parentheses. The sample period is from 2011–2013. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Temporal effects are evident after the announcement: highest rise in inflation expectations after first round of implementation

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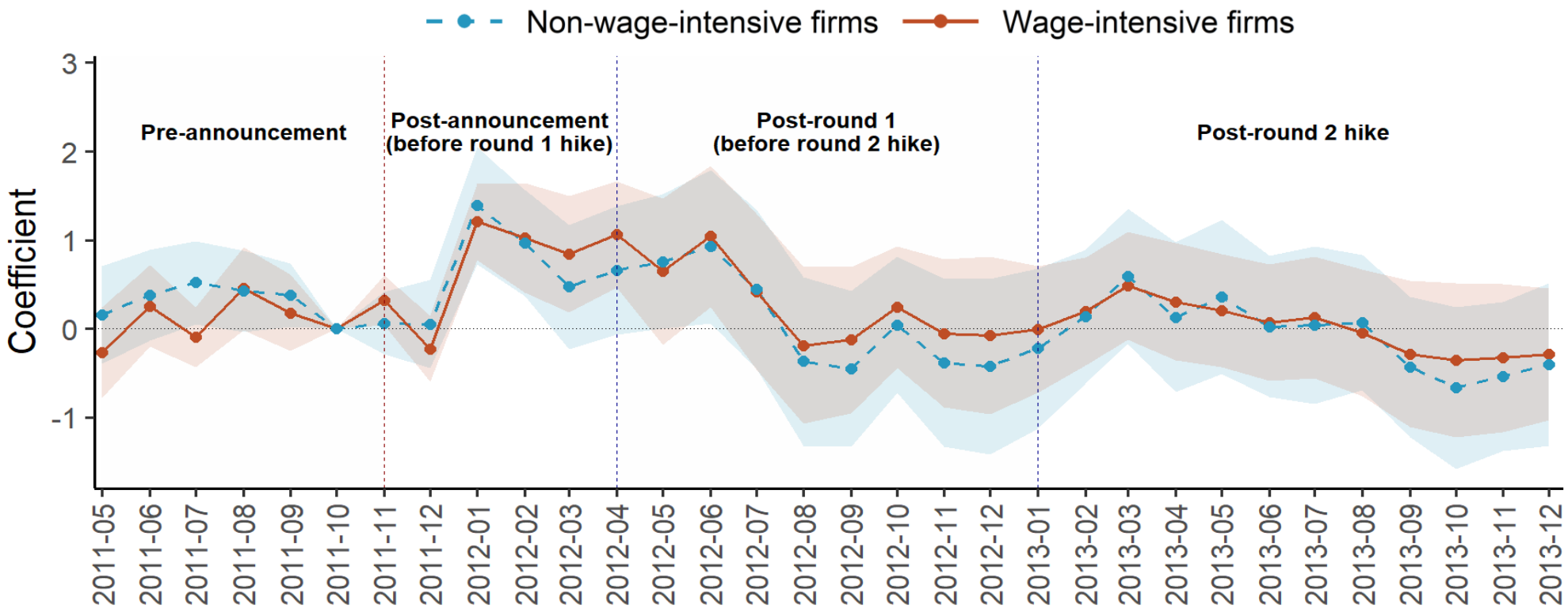
Temporal effects are evident after the announcement: highest rise in inflation expectations after first round of implementation

Heterogeneity by wage attentiveness: firms with high wage-intensity exhibit stronger responses around announcement.

Heterogeneity around implementation are *not* significant: indicating responses to information rather realized wage hike

Event-Study

$$\pi^{e}_{i,t} = \sum_{\tau \neq -1} \sum_{j} \beta^{\tau}_{j} FA_{s,p} \times WageIntensity_{j} \times 1\{t = \tau\} + \beta X_{t-1} + \gamma W_i (+\lambda_t) + \epsilon_{i,t},$$



Wage-attentive firms raise their inflation expectation for ***4-5 months post-announcement.***
The effects are more *short-lived* for non-wage-intensive firms.

Heterogeneity is driven by "information channel" (post-announcement), rather than by "cost-channel" (post-realized wage hike)

Role of Inflation Expectations on Firm Decisions

(price-setting, investment and employment)

Two-stage Regression

Second-stage regression (ordinal logistic regression)

Estimate how firms' inflation expectations affect firm behavior (price-setting, investment, employment) and address potential endogeneity of $\pi^{e}_{i,t}$

$$Y_{i,t+h} = c + \beta\hat{\pi}^{e}_{i,t} + \delta X_{t-1} + \theta Z_{i,t} + \alpha_i W_i + \epsilon_{i,t},$$

- $Y_{i,t+h}$: whether firm i raises/retains/lowers its product prices/investment/employment in period t or the future period $t+h$
- X_{t-1} : lagged macro variables
- $Z_{i,t}$: firm-level controls, including firm's outlook on demand and costs
- W_i : firm characteristics (time-invariant) such as sector, size, region

First-stage regression

$$\pi^{e}_{i,t} = \gamma_0\pi^{e}_{i,t-1} + \sum_{p=0}^{1}\sum_{j}\gamma_1^{j,h,p}(\varepsilon^{oil}_{h,t-p} \times \text{Oil Attention}_j \times \text{Inflation Episode}_t) + \gamma_2 X_{t-1} + \gamma_3 Z_{i,t} + \gamma_4 W_i + v_{it},$$

- $\varepsilon^{oil}_{h,t-p}$: oil news shock as instrument variable
- $Oil\ Attention_i$ – firm survey responses with oil as factors driving inflation expectations

First Stage Results

Table A.6: First-stage regression: Drivers of firm inflation expectations

	Dependent variable: Midpoint of expected inflation range	
Variables	**1**	**2**
Lagged inflation expectation	0.810***	0.687***
	(0.003)	(0.010)
Oil news shocks × Oil-attentive firm × Higher inflation	0.028	0.013
	(0.021)	(0.026)
Oil news shocks × Oil-nonattentive firm × Higher inflation	0.019	0.020
	(0.017)	(0.020)
Oil news shocks × Oil-attentive firm × Lower inflation	0.026**	0.026**
	(0.012)	(0.012)
Oil news shocks × Oil-nonattentive firm × Lower inflation	0.018*	0.015
	(0.010)	(0.010)
Lagged oil news shocks × Oil-attentive firm × Higher inflation	0.097***	0.069***
	(0.021)	(0.024)
Lagged oil news shocks × Oil-nonattentive firm × Higher inflation	0.061***	0.056***
	(0.017)	(0.020)
Lagged oil news shocks × Oil-attentive firm × Lower inflation	0.035***	0.039***
	(0.012)	(0.012)
Lagged oil news shocks × Oil-nonattentive firm × Lower inflation	0.002	-0.001
	(0.010)	(0.009)
Observations	41,356	41,356
Adj. R-squared	0.740	0.756
Firm characteristics	Yes	No
Firm fixed effects	No	Yes

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Oil news shocks significantly drive firm inflation expectation,

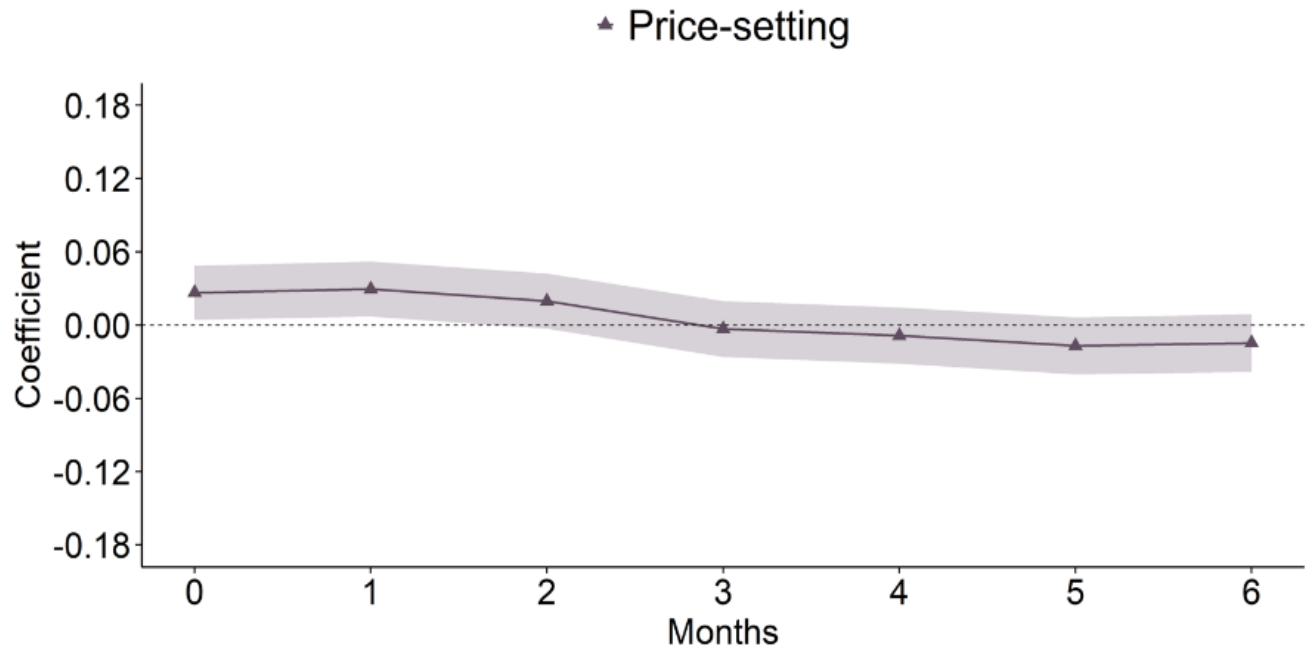
Responses vary by oil-attentiveness, and inflation regime

Impacts on Pricing

Effects of Inflation Expectations on Price-setting

Variables	1 (h=0)	2 (h=0)	3 (h=1)	4 (h=1)
Instrumented inflation expectation	0.027		0.030	
Inflation expectation		0.027		0.018
Lagged MPI growth (% YoY)	0.051	0.048	0.049	0.048
Lagged GDP growth (% YoY)	-0.004	-0.016	-0.007	-0.019
Lagged USD/THB (% YoY)	-0.017	-0.018	-0.015	-0.014
Observations	40,302	40,302	39,350	39,350
RMSE	1.41	1.45	1.41	1.45
Firm-level controls				
Time-invariant	Yes	Yes	Yes	Yes
Time-varying	Yes	Yes	Yes	Yes

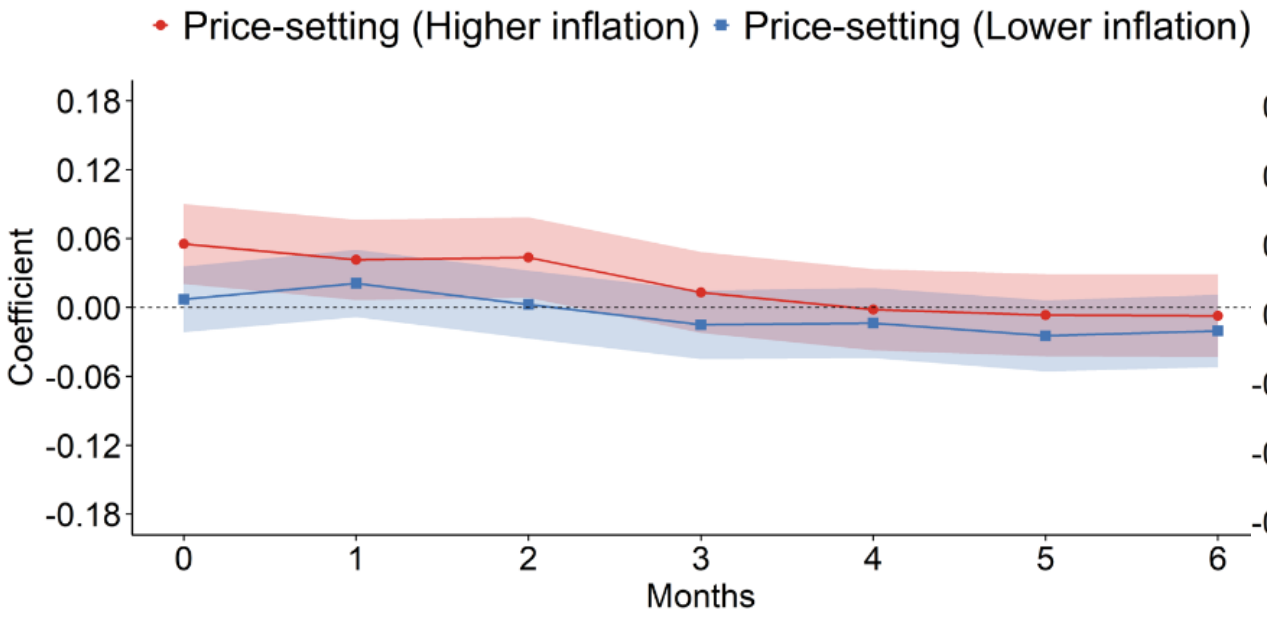
Note: Coefficients are reported with 90% confidence intervals.

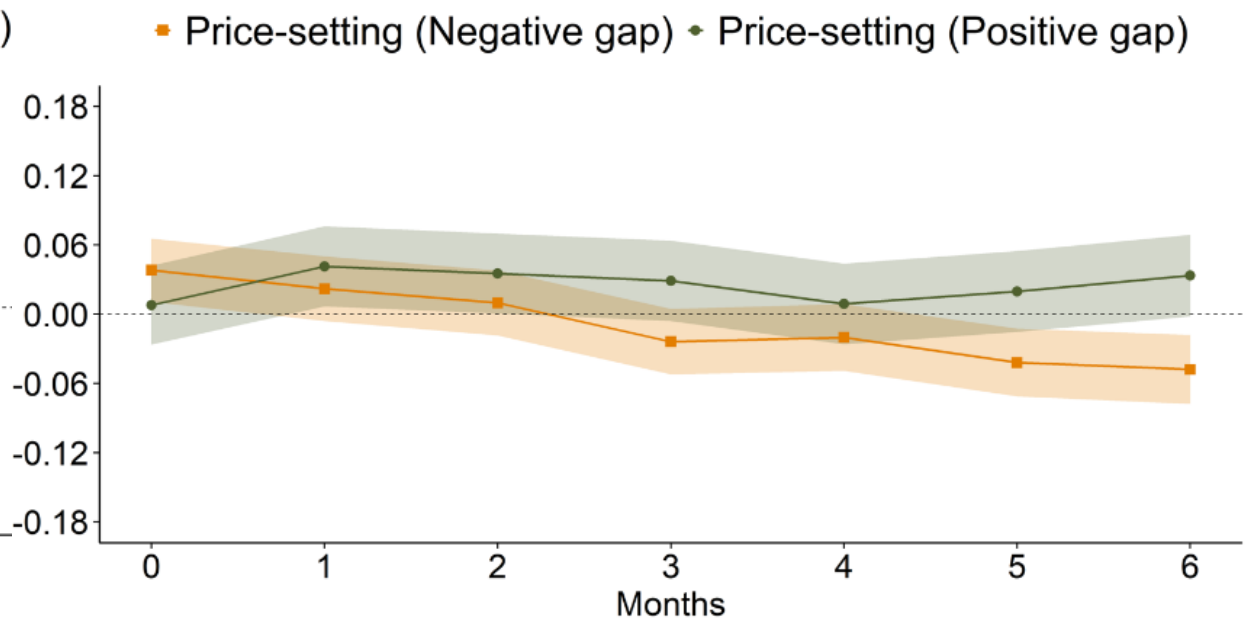


Firms increase prices in response to higher inflation expectation

- Results consistent with literature

Impacts on Pricing





By inflation episodes

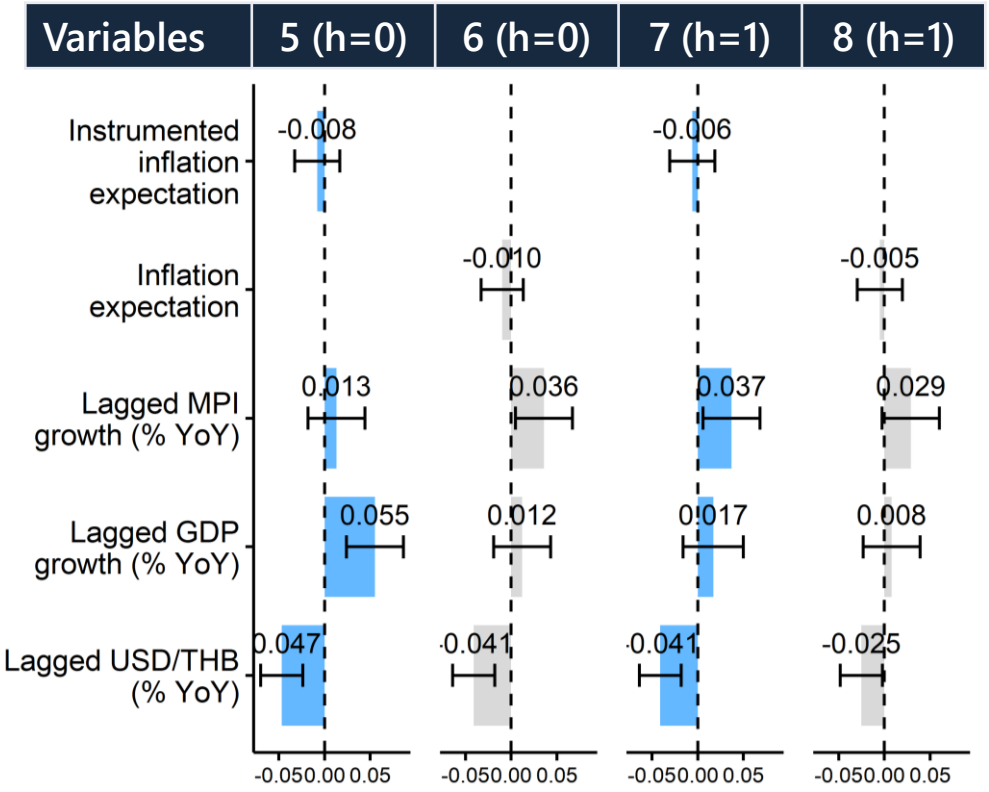
- Higher price adjustment during first 3 months for high-inflation episodes
- Insignificant during low-inflation episode

By output gap

- Positive gap: significant price hike during *lagged 1 to 2 month*
- Negative gap: positive increase during *t*

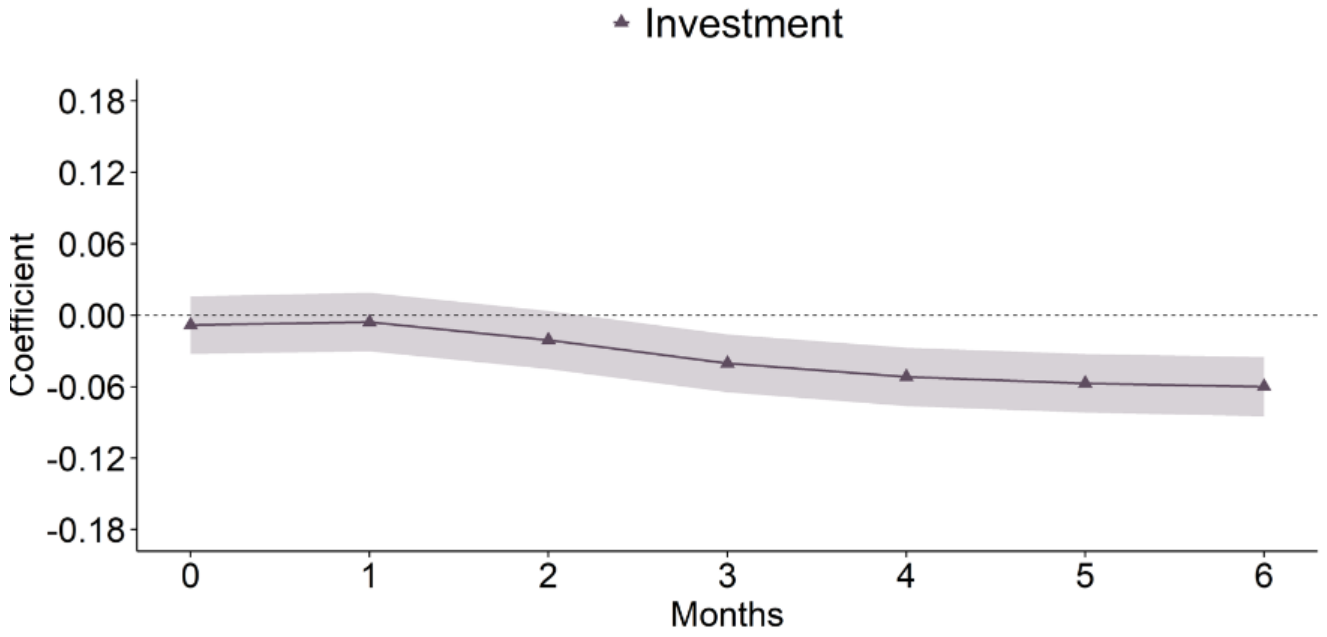
Impacts on Investment

Effects of Inflation Expectations on Investment



	5 (h=0)	6 (h=0)	7 (h=1)	8 (h=1)
Observations	39,898	40,216	35,506	35,775
RMSE	1.48	1.47	1.51	1.51
Firm-level controls				
Time-invariant	Yes	Yes	Yes	Yes
Time-varying	Yes	Yes	Yes	Yes

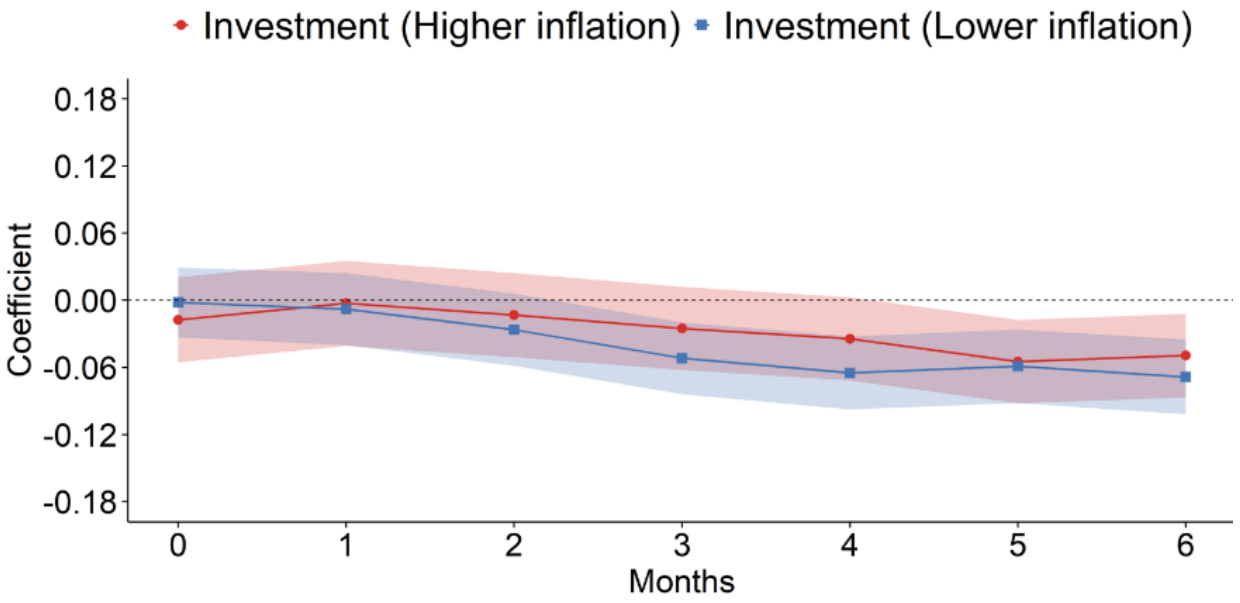
Note: Coefficients are reported with 90% confidence intervals.

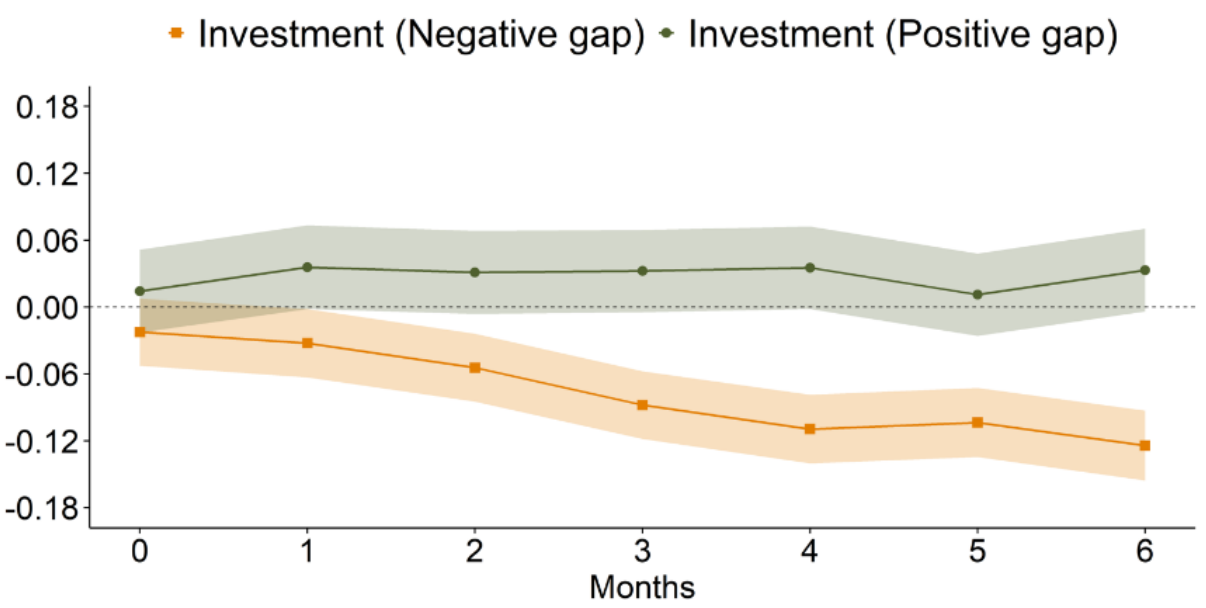


Negative effects on investment during lagged month 2 to 6

- Results consistent with literature

Impacts on Investment





By inflation episodes

- Not statistically significantly different by inflation episodes
- Slightly faster responses during low-inflation episode

By output gap

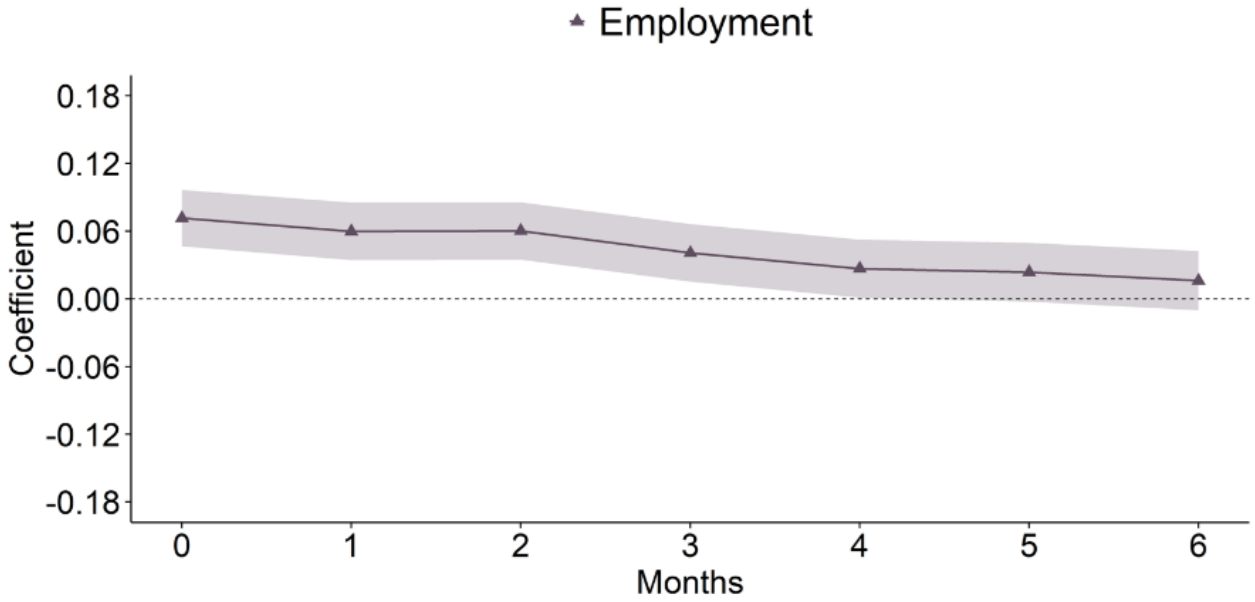
- No negative effects on investment during positive output gap
- The effects are persistent and increasing in sizes during negative output gap

Impacts on Employment

Effects of Inflation Expectations on Employment

Variables	9 (h=0)	10 (h=0)	11 (h=1)	12 (h=1)
Instrumented inflation expectation	0.072		0.060	
Inflation expectation		0.057		0.063
Lagged MPI growth (% YoY)	0.013	0.012	0.036	0.034
Lagged GDP growth (% YoY)	0.087	0.084	0.051	0.041
Lagged USD/THB (% YoY)	0.027	0.031	0.045	0.047
Observations	40,722	41,037	36,276	36,542
RMSE	1.36	1.36	1.38	1.38
Firm-level controls				
Time-invariant	Yes	Yes	Yes	Yes
Time-varying	Yes	Yes	Yes	Yes

Note: Coefficients are reported with 90% confidence intervals.

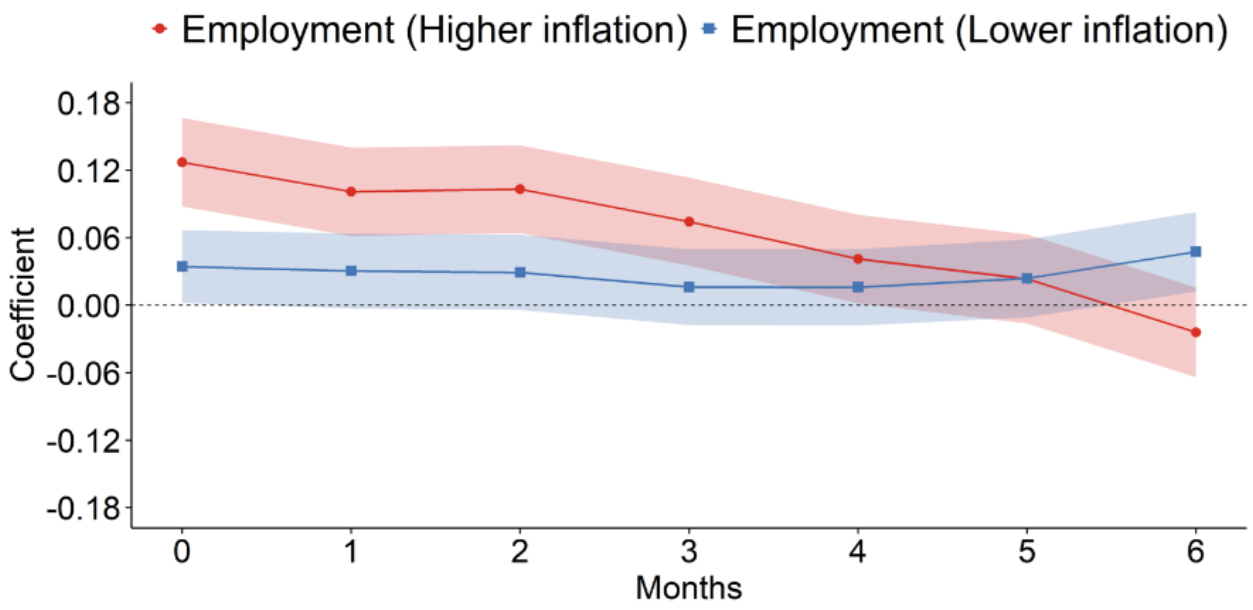


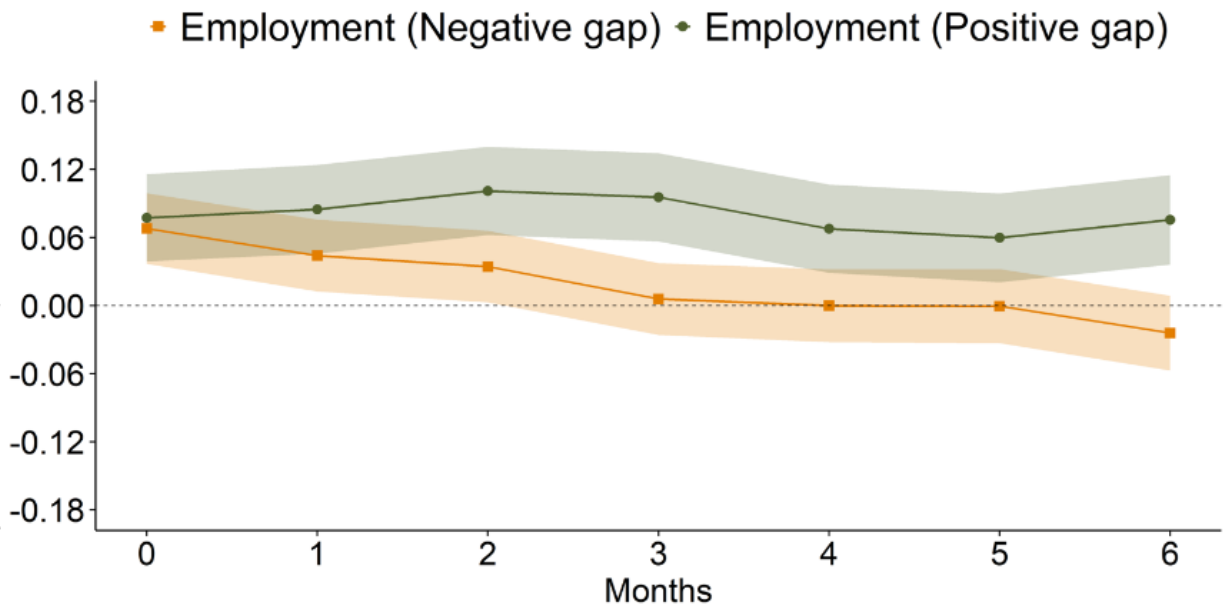
Firms increase employment in response to higher inflation expectations

- In contrary to literature
- Could be explained by real wage effects

or context specific (rise in inflation expectation coincides with economic recovery)

Impacts on Employment





By inflation episodes

- Higher during high inflation episodes

By output gap

- Increase in employment during positive output gap
- Increase in employment during t to t+2 during negative output gap (surprising, and could be due to rising inflation episodes coincides with economic recovery)

Conclusion

Macro-driven expectation

Thai firms' expected inflation, while being biased and dispersed, responds to a range of macro factors, particularly **global ones.**

- Greater responses to recent inflation in high-inflation + strong growth environment

State-dependent expectation

Oil shocks can lead to persistent changes in expected inflation, mainly in **high-inflation** episodes

Firm decisions

Inflation expectations matter to firm behaviors, influencing **price-setting, investment** and **hiring decisions**.